StorageTek 8 Gb FC PCI-Express HBA, Emulex Installation Guide For HBA Models SG-XPCIE1FC-EM8-Z, SG-PCIE1FC-EM8-Z, SG-XPCIE1FC-EM8-N, SG-PCIE1FC-EM8-N and SG-XPCIE2FC-EM8-Z, SG-PCIE2FC-EM8-Z, SG-XPCIE2FC-EM8-N, SG-PCIE2FC-EM8-N, 7105391

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Using This Documentation

- **Overview** – Describes how to install and maintain the host bus adapter
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

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♦ ♦ ♦ CHAPTER 1

HBA Overview

This chapter provides a basic overview of the single and dual port StorageTek 8 Gb Fibre Channel (FC) PCI-Express host bus adapter (HBA), Emulex (referred to as StorageTek 8 Gb FC PCI-Express HBA in this document), which uses Emulex technology. This chapter also describes the various operating systems, host platforms, storage, and infrastructure configurations that support the HBA and lists the HBA environmental requirements.

This chapter contains the following topics:

- "Kit Contents" on page 9
- "HBA Features and Specifications" on page 9
- "System Interoperability" on page 11
- "Operating System and Technology Requirements" on page 11
- "System Interoperability" on page 11
- "Boot Support" on page 15
- "Environmental Requirements" on page 15

Kit Contents

- StorageTek 8 Gb FC PCI-Express HBA, Emulex
- Extra PCI full-size bracket
- *Accessing Documentation* document
- P002403-05A China RoHS Material disclosure

HBA Features and Specifications

The StorageTek 8 Gb FC PCI-Express HBA, Emulex (single port: SG-XPCIE1FC-EM8-Z, SG-PCIE1FC-EM8-Z, SG-XPCIE1FC-EM8-N, SG-PCIE1FC-EM8-N, 7105391 dual port: SG-XPCIE2FC-EM8-Z, SG-PCIE2FC-EM8-Z, SG-XPCIE2FC-EM8-N, SG-PCIE2FC-EM8-N) consists of a single-wide, FC bus expansion board. The board interfaces a four- or eight-lane PCI-Express bus, with the four or eight lanes supporting one or two Fibre Channel

(FC) optical media ports. Each independent FC port operates at 8 Gbit/sec and features 8/4/2 autonegotiation.

See Table 1-1 for a list of the HBA features.

TABLE 1-1 HBA Features and Specifications

Feature	Description
PCIconnector	x8
PCI signaling environment	PCI Express x8 (8 active lanes)
PCI lane usage	x8 lanes
PCItransfer rate (maximum)	PCI Express Generation One x8 (2.5 GT/s) in an electrically x8 slot (default)
	PCI Express Generation Two x4 (5.0 GT/s) in an electrically x4 slot
Number of FC ports	One (single port) or Two (dual port)
Number of devices supported	126 devices per FC loop; 510 devices in Fabric mode
FC bus type (external)	Fiber-optic media, short-wave, multi-mode fiber (400-M5- SN-S)
FC transfer rate	400 MBps per port maximum, half-duplex
	800 MBps per port maximum, full-duplex
FC topologies	Switched fabric (N-Port), arbitrated loop (NL-Port), and point-to-point (N-Port)
RAM	1.5 MB, parity protected, per port
BIOS ROM (FC)	One 4-MB (dual-port) or 2-MB (single-port) flash ROM
NVRAM	One 2-KB EEPROM per port
External connectors	One Small-Form Factor Pluggable (SFP) multimode optic with LC-style connectors per port
Maximum FC cable length	2 Gb/s: 500 meters using 50/125 mm core OM3 fiber
	300 meters using 50/125 mm core OM2 fiber
	150 meters using 62.5/125 mm core OM1 fiber
	4 Gb/s: 380 meters using 50/125 mm core OM3 fiber
	150 meters using 50/125 mm core OM2 fiber
	70 meters using 62.5/125 mm core OM1 fiber
	8 Gb/s: 150 meters using 50/125 mm core OM3 fiber
	50 meters using 50/125 mm core OM2 fiber
	21 meters using 62.5/125 mm core OM1 fiber
LED indicators	Two LEDs per port (yellow and green) on the front panel as status indicators.
Maximum power consumption	13.3W (dual port), 10.1W (signal port)
Form Factor	Low-profile MD2 form factor

Operating System and Technology Requirements

The HBA requires the OS and technology levels listed in Table 1-2.

TABLE 1-2 Supported Operating System/Technology Versions (Minimum)

Operating System/Technology	Supported Versions (minimum)
Oracle Solaris OS for the x86 (64-bit) platform	■ Oracle Solaris 10 01/13 with patches 149174-04, 144189-02, and 150401-16 ■ Oracle Solaris 11.1 with SRU 16 ■ Oracle Solaris 11.2 To obtain the latest patches and SRUs, go to http://support.oracle.com
Oracle Solaris OS for the SPARC (64-bit) platform	■ Oracle Solaris 10 01/13 with patches 149173-04, 144188-02, and 150400-16 ■ Oracle Solaris 11.1 with SRU 16 ■ Oracle Solaris 11.2 To obtain the latest patches and SRUs, go to http://support.oracle.com
Linux OS	■ Oracle Linux 5.9 (Red Hat Compatible Kernel (RHCK) and Unbreakable Enterprise Kernel (UEK) 2, at minimum) ■ Oracle Linux 6.4 (RHCK and UEK2, at minimum) ■ Red Hat Enterprise Linux 5.9 (64-bit) ■ Red Hat Enterprise Linux 6.4 (64-bit) ■ SUSE Linux Enterprise Server 11 SP2 (32-bit and 64-bit)
Microsoft Windows OS Standard, Enterprise, and Datacenter Editions	■ Window Server 2008 R2 including SP1 ■ Windows Server 2012
VMware Technology	■ VMware ESX/ESXi 5.0 ■ VMware ESX/ESXi 5.1

System Interoperability

This section provides information about selected platforms and storage that are compatible with the heterogeneous FC network design of the HBA. This section contains the following topics:

- "Host Platform Support" on page 11
- "Storage Support" on page 13
- "Switch Support " on page 14

Host Platform Support

The HBA is supported by the platforms listed in Table 1-3. For up-to-date information, see your system Product Notes and web pages.

TABLE 1-3 Platform Support

Platform	Supported OS/Technology
Oracle SPARC Servers	
SPARC Enterprise T2000	Oracle Solaris
SPARC Enterprise T5120	Oracle Solaris
SPARC Enterprise T5140	Oracle Solaris
SPARC Enterprise T5220	Oracle Solaris
SPARC Enterprise T5240	Oracle Solaris
SPARC Enterprise T5440	Oracle Solaris
SPARC Enterprise M4000	Oracle Solaris
SPARC Enterprise M5000	Oracle Solaris
SPARC Enterprise M8000	Oracle Solaris
SPARC Enterprise M9000-32	Oracle Solaris
SPARC Enterprise M9000-64	Oracle Solaris
SPARC M5-32	
SPARC T4-1	Oracle Solaris
SPARC T4-2	Oracle Solaris
SPARC T5-2	Oracle Solaris
SPARC T5-4	Oracle Solaris
SPARC T5-8	Oracle Solaris
Sun Fire V445	Oracle Solaris
Sun Fire V245	Oracle Solaris
Sun Ultra U45	Oracle Solaris
Oracle x86 Servers	
Sun Blade X4-2B	
Sun Fire X4100 M2	Oracle Solaris, Windows, Linux, VMware
Sun Fire X4200 M2	Oracle Solaris, Windows, Linux, VMware
Sun Fire X4600	Oracle Solaris, Windows, Linux, VMware
Sun Fire X4600 M2	Oracle Solaris, Windows, Linux, VMware
Sun Fire X4440	Oracle Solaris, Windows, Linux, VMware
Sun Fire X4450	
Sun Fire X4240	Oracle Solaris, Windows, Linux, VMware
Sun Fire X4140	Oracle Solaris, Windows, Linux, VMware
Sun Fire X4150	
Sun Fire X2100 M2	Oracle Solaris, Windows, Linux, VMware
Sun Fire X2200 M2	Oracle Solaris, Windows, Linux, VMware
Sun Server X2-4	Oracle Solaris, Linux, VMware, and Windows
Sun Server X3-2	Oracle Solaris, Linux, VMware, and Windows
Sun Server X3-2L	Oracle Solaris, Linux, VMware, and Windows

Platform	Supported OS/Technology
Sun Server X4-2	Oracle Solaris, Linux, VMware, and Windows
Sun Server X4-2L	Oracle Solaris, Linux, VMware, and Windows

The host system must have at least one PCI-Express 8-lane slot to support the HBA.

Storage Support

This section lists the arrays and tape storage supported by the HBA. This section contains the following topics:

- "Array Support" on page 13
- "Storage System Support" on page 13
- "Tape Storage Support" on page 13

Array Support

The HBA supports connecting to, using a supported switch, the following arrays:

- StorageTek 2540
- StorageTek 6140
- StorageTek 6540

Storage System Support

The HBA supports connecting to, using a supported switch, the following storage systems:

- StorageTek 9990
- StorageTek 9980/9985
- StorageTek 9970

Tape Storage Support

The HBA supports connecting to, using a supported switch, the following tape storage:

- StorageTek SL48 tape library
- StorageTek SL24 tape autoloader
- StorageTek SL500 modular library

- StorageTek SL1400 tape library
- StorageTek SL3000 tape library
- StorageTek L8500 modular library
- StorageTek Virtual Tape Library (VTL): VTL Value and VTL Plus
- StorageTek T10000A and T10000B
- StorageTek T9840C, and T9840D tape drives
- StorageTek T9940B tape drive
- IBM and HP LT03 tape drives
- IBM and HP LT04 tape drives
- Quantum S4 tape drive

Switch Support

The HBA supports the following Fibre Channel switches:

- Brocade DCX backbone switch
- Brocade 200E switch
- Brocade 300 switch
- Brocade SW4100 switch
- Brocade SW4900 switch
- Brocade SW5000 switch
- Brocade SW5100 switch
- Brocade SW5300 switch
- Brocade SW7500 switch
- Cisco MDS9124 24-port multilayer fabric switch
- Cisco MDS 9134 multilayer fabric switch
- Cisco MDS 9140 multilayer fabric switch
- Cisco MDS 9216A multilayer fabric switch
- Cisco MDS 9216i multilayer fabric switch
- Cisco MDS 9222i multiservice modular switch
- Cisco MDS 9509 multilayer director
- Cisco MDS 9513 multilayer director
- McData Mi10K director
- McData 6140 director
- QLogic 9000
- QLogic 5800

The HBA is supported by all 1-Gb Ethernet switches.

Boot Support

The HBA supports the following minimum boot types:

- Oracle Solaris 10 01/13 for the x86 and SPARC environments
- Oracle Solaris 11.1 for the x86 and SPARC environments
- Preboot Execution Environment (PXE) boot capable (for x86 systems)
- RHEL 5.9 and 6.4
- SLES 11 SP2
- VMware ESX/ESXi 5.0 and 5.1
- Windows Server 2008, R2 including SP1
- Windows Server 2012

Environmental Requirements

The HBA environmental requirements are listed in Table 1-4.

TABLE 1-4 HBA Environmental Requirements

Specification	Operating	Non-Operating
Temperature	0˚ to 55˚C, non-condensing	-40˚C to 70˚C, non-condensing
Airflow	150 lfm	n/a
Humidity	10% to 90% RH, non-condensing, 27˚C max wet bulb	93% RH, nonconducting, 38˚C max wet bulb
Altitude	3200m	12,200m
Vibration	0.20G in all axes swept for 5-500 Hz sine	1.0G in all axes 5-500-5 Hz sine
Shock	5G, 11 ms half-sine	30G, 11 ms half-sine

♦ ♦ ♦ CHAPTER 2

Hardware Installation and Removal

This chapter describes the tasks required to install and remove the HBA. Refer to your system installation or service manual for detailed instructions.

This chapter contains the following topics:

- "Observing ESD and Handling Precautions" on page 17
- "Installing the Hardware" on page 18
- "Testing the Installation" on page 25"Testing the Installation" on page 25
- "Replacing the SFP+ Unit on the HBA" on page 30
- "Removing the Hardware" on page 30

Observing ESD and Handling Precautions

Caution - Damage to the HBA can occur as the result of careless handling or electrostatic discharge (ESD). Always handle the HBA with care to avoid damage to electrostatic sensitive components.

To minimize the possibility of ESD-related damage, use both a workstation antistatic mat and an ESD wrist strap. You can get an ESD wrist strap from any reputable electronics store or from Oracle as part number #250-1007. Observe the following precautions to avoid ESD-related problems:

- Leave the HBA in its antistatic bag until you are ready to install it in the system.
- Always use a properly fitted and grounded wrist strap or other suitable ESD protection when handling the HBA, and observe proper ESD grounding techniques.
- Hold the HBA by the edge of the PCB, not by the connectors.
- Place the HBA on a properly grounded antistatic work surface pad when it is out of its protective antistatic bag.

Installing the Hardware

The hardware installation process involves the following general steps, as described in these sections:

- "To Install the HBA" on page 18
- "To Connect the Optical Cable" on page 22
- "To Apply Power" on page 23
- "To Verify Proper Installation (Oracle Solaris)" on page 25
- "To Verify Attached Storage (Oracle Solaris)" on page 28

▼ To Install the HBA

The HBA comes with a low-profile PCIe bracket installed. A standard bracket is included in the box with the HBA. The low-profile mounting bracket is shorter than the standard bracket; approximately 3.11 in. (7.9 cm) compared to 4.75 in. (12.06 cm). If you need to change the bracket for HBA installation, you must first remove the optical transceiver (two transceivers on the two-port adapter) from its housing. This procedure covers how to install the HBA and, if necessary, how to remove the transceiver and change the bracket safely.

The HBA uses different types of transceivers. This procedure shows an example of one type.

1. **Attach an antistatic strap (refer to "Observing ESD and Handling Precautions" on page 17).**
2. **Refer to your system installation or service manual to determine an appropriate PCI-Express slot in which to install the HBA.**
3. **Shut down, power off, and unplug the system, if required.**
4. **Remove the system case.**
5. **Remove the blank panel from an empty PCI-Express slot.**
6. **(Optional) Perform the following steps to replace the PCI bracket.**

    a. **Remove the transceiver from its cage assembly (see Figure 2-2) by pulling the bail (handle) out and down to release the latch and gently pull the transceiver out of its housing.**

    Do not force it. After the latch is released, the transceiver slides out easily..

Caution - This is a delicate operation–take care not to damage the transceiver.

FIGURE 2-1 Optical Transceiver

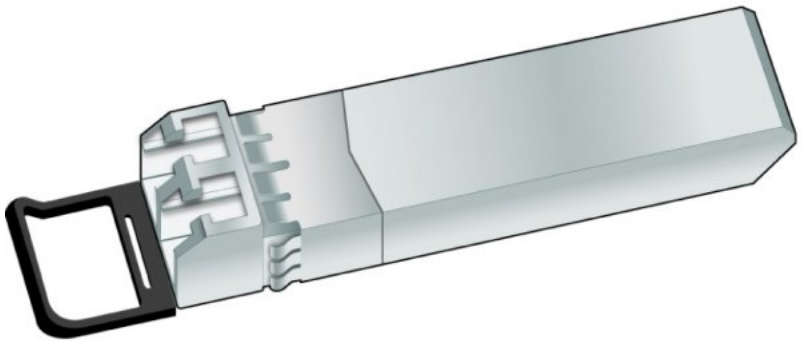
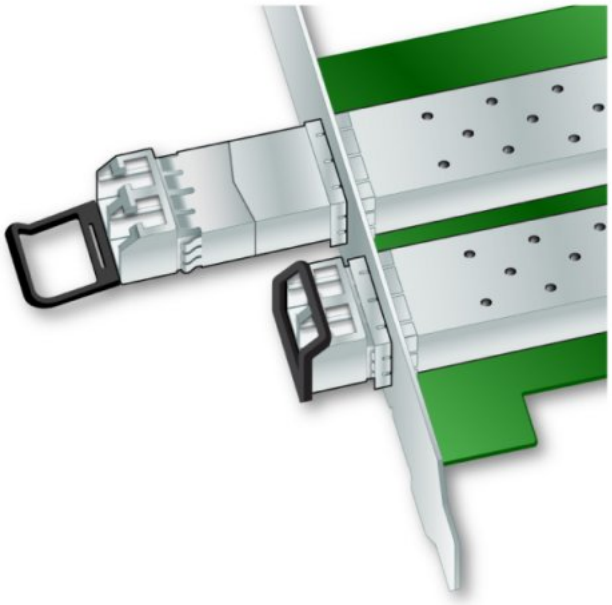


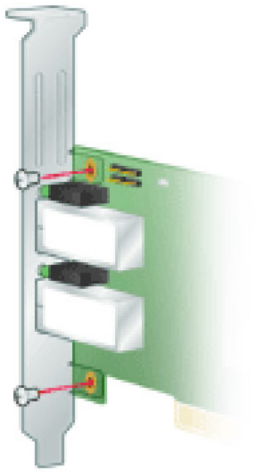
FIGURE 2-2 A Partly Extracted Optical Transceiver and an Optical Transciever That is Latched In Place



b. Observing ESD precautions, store the transceiver in an ESD-safe place.

c. Remove the mounting bracket screws from the top of the HBA.

FIGURE 2-3 Removing the Bracket Mounting Screws



d. Remove the bracket and store it for future use.

e. Align the new mounting bracket tabs with the holes in the HBA.

Caution - Be careful not to push the bracket past the transceiver housing's grounding tabs. Make sure the LEDs are properly aligned with the holes in the bracket.

f. Re-install the screws that attach the HBA to the bracket.

g. Re-install the transceiver by sliding it into the housing.

When the latch engages, it clicks.

h. Push the bail back into place.

7. Insert the HBA into the empty PCI-Express 8-lane slot and press firmly until the adapter is seated.

8. Secure the mounting bracket of the HBA to the case with the panel screw or clip.

9. Replace the computer case and tighten the case screws.

The HBA is now installed in the computer and is ready for media attachment.

▼ To Connect the Optical Cable

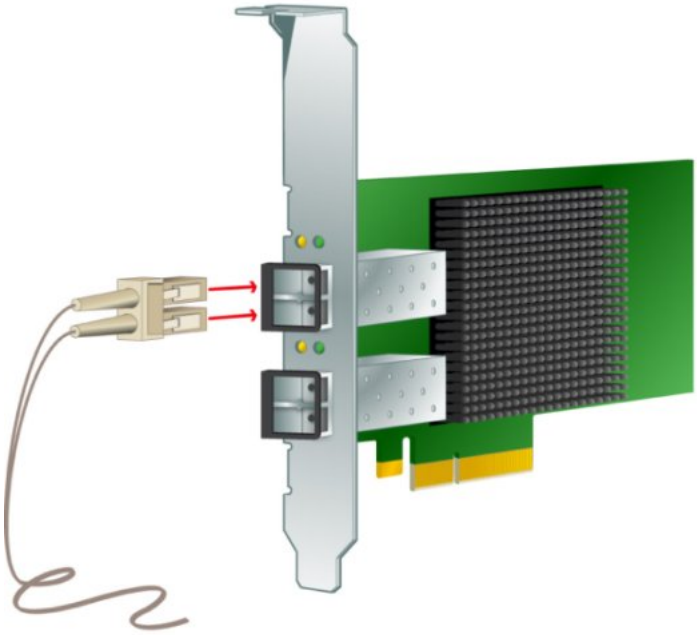
Note - The HBA does not allow normal data transmission on an optical link unless it is connected to another similar or compatible Fibre Channel product (that is, multimode to multimode).

Use multimode fiber-optic cable, intended for short-wave lasers, that adheres to the specifications in the following table.

Fiber-Optic Cable	Maximum Length	Minimum Length	Connector
OM3 - Multimode 50/125 micron fiber (2000 MHz*km bandwidth cable)	2.125 Gb/s: 0.5m - 500m 4.25 Gb/s: 0.5m - 380m 8.5 Gb/s 0.5m – 150m	.5 meters	LC
OM2 - Multimode 50/125 micron fiber (500 MHz*km bandwidth cable)	2.125 Gb/s: 0.5m – 300m 4.25 Gb/s: 0.5m – 150m 8.5 Gb/s 0.5m – 50m	.5 meters	LC
OM1 - Multimode 62.5/125 micron fiber (200 MHz*km bandwidth cable)	2.125 Gb/s: 0.5m – 150m 4.25 Gb/s: 0.5m – 70m 8.5 Gb/s 0.5m – 21m	.5 meters	LC

1. **Connect the fiber-optic cable to an LC connector on the HBA (see Figure 2-4).**

FIGURE 2-4 Attaching the Optical Cable



2. **Connect the other end of the cable to the FC device.**

   After the optical cable is connected to the HBA, you can power on the system.

▼ To Apply Power

1. **Verify that the HBA is securely installed in the system.**
2. **Verify that the correct fiber-optic cable is attached.**
3. **Refer to your system installation or service manual to determine how to power on the system.**

(LED) Status

Yellow and green LEDs can be seen through openings in the mounting bracket of the HBA. Each port has a corresponding set of yellow and green LEDs (see Figure 2-5).

FIGURE 2-5 LEDs

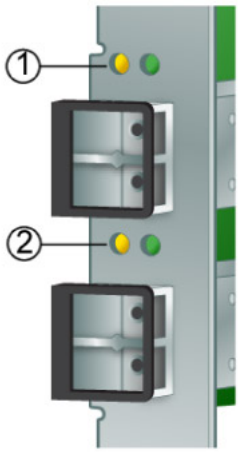


Figure Legend

1 Port 0 LEDs
2 Port 1 LEDs

Observe the light-emitting diode (LED) status for the power-on self test (POST) results as shown in the following table.

Green LED	Yellow LED	State
Off	Off	Wake-Up Failure (Dead Board)
Off	On	POST failure (Dead Board)
Off	Slow Blink	Wake-Up Failure Monitor
Off	Fast Blink	Failure in POST
Off	Flashing	POST Processing in Progress
On	Off	Failure While Functioning
On	On	Failure While Functioning
On	2 Fast Blinks	2 Gb Link Rate – Normal, Link up
On	3 Fast Blinks	4 Gb Link Rate – Normal, Link up
On	4 Fast Blinks	8 Gb Link Rate – Normal, Link up
Slow Blink	Off	Normal – Link Down or not started
Slow Blink	On	Not Defined
Slow Blink	Slow Blink	Off-line for Download
Slow Blink	Fast Blink	Restricted Off-line Mode (Waiting for Restart)
Slow Blink	Flashing	Restricted Off-line Mode, Test Active
Fast blink	Off	Debug Monitor in Restricted Mode
Fast blink	On	Not Defined

Testing the Installation

This section contains the following topics:

- "To Verify Proper Installation (Oracle Solaris)" on page 25
- "To Verify Attached Storage (Oracle Solaris)" on page 28

▼ To Verify Proper Installation (Oracle Solaris)

1. **Use the `show-devs` command at the `ok` prompt to list the installed devices.**

   The HBA can be identified in the output by looking for the `SUNW,emlxs@`*n* and `SUNW,emlxs@`*n*`,1` node names, where *n* is usually a single-digit number from 0 to 9. In this example, there are two dual port and one single port HBAs installed.

```
{0} ok show-devs
/pci@7c0/pci@0
/pci@7c0/pci@0/pci@9
```

```
/pci@7c0/pci@0/pci@8
/pci@7c0/pci@0/pci@2
/pci@7c0/pci@0/pci@2
/pci@7c0/pci@0/pci@1
/pci@7c0/pci@0/pci@9/SUNW,emlxs@0,1
/pci@7c0/pci@0/pci@9/SUNW,emlxs@0
/pci@7c0/pci@0/pci@9/SUNW,emlxs@0,1/fp@0,0
```

(*continued*)

```
/pci@7c0/pci@0/pci@9/SUNW,emlxs@0,1/fp@0,0/disk
/pci@7c0/pci@0/pci@9/SUNW,emlxs@0/fp@0,0
/pci@7c0/pci@0/pci@9/SUNW,emlxs@0/fp@0,0/disk
/pci@7c0/pci@0/pci@8/SUNW,emlxs@0
/pci@7c0/pci@0/pci@8/SUNW,emlxs@0/fp@0,0
/pci@7c0/pci@0/pci@8/SUNW,emlxs@0/fp@0,0/tape/pci@7c0/pci@0/pci@8/SUNW,emlxs@0/fp@0,0/
disk
/pci@7c0/pci@0/pci@2/network@0,1
/pci@7c0/pci@0/pci@2/network@0
/pci@7c0/pci@0/pci@1/pci@0,2
/pci@7c0/pci@0/pci@1/pci@0
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@2,1
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@2
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1,1
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@2,1/fp@0,0
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@2,1/fp@0,0/disk
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@2/fp@0,0
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@2/fp@0,0/disk
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1,1/fp@0,0
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1,1/fp@0,0/tape
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1,1/fp@0,0/disk
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1/fp@0,0
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1/fp@0,0/tape
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,emlxs@1/fp@0,0/disk
/pci@7c0/pci@0/pci@1/pci@0/ide@8
/pci@7c0/pci@0/pci@1/pci@0/usb@6
/pci@7c0/pci@0/pci@1/pci@0/usb@5
/pci@7c0/pci@0/pci@1/pci@0/isa@2
/pci@7c0/pci@0/pci@1/pci@0/ide@8/cdrom
/pci@7c0/pci@0/pci@1/pci@0/ide@8/disk
/pci@7c0/pci@0/pci@1/pci@0/usb@6/hub@1
/pci@7c0/pci@0/pci@1/pci@0/isa@2/serial@0,3f8
/pci@780/pci@0
/pci@780/pci@0/pci@9
/pci@780/pci@0/pci@8
/pci@780/pci@0/pci@2
/pci@780/pci@0/pci@1
/pci@780/pci@0/pci@9/scsi@0
```

(*continued*)

```
/pci@780/pci@0/pci@9/scsi@0/disk
```

```
/pci@780/pci@0/pci@9/scsi@0/tape
/pci@780/pci@0/pci@8/SUNW,emlxs@0,1
/pci@780/pci@0/pci@8/SUNW,emlxs@0
/pci@780/pci@0/pci@8/SUNW,emlxs@0,1/fp@0,0
/pci@780/pci@0/pci@8/SUNW,emlxs@0,1/fp@0,0/tape
/pci@780/pci@0/pci@8/SUNW,emlxs@0,1/fp@0,0/disk
/pci@780/pci@0/pci@8/SUNW,emlxs@0/fp@0,0
/pci@780/pci@0/pci@8/SUNW,emlxs@0/fp@0,0/tape
/pci@780/pci@0/pci@8/SUNW,emlxs@0/fp@0,0/disk
/pci@780/pci@0/pci@1/network@0,1
/pci@780/pci@0/pci@1/network@0
/packages/SUNW,builtin-drivers
{c} ok
```

2. **To positively identify the port as a StorageTek 8 Gb FC port, use the `cd` command to change to the `SUNW,emlxs@`*n* directories, and use the `.properties` command.**

   In this example, the `.properties` command output displays the properties of the two ports in a dual port HBA.

```
ok cd /pci@780/pci@0/pci@8/SUNW,emlxs@0
{c} ok .properties
assigned-addresses       82060010 00000000 00300000 00000000 00002000
                         82060018 00000000 00304000 00000000 00004000
                         81060020 00000000 00000000 00000000 00000100
                         82060030 00000000 00340000 00000000 00040000
port_wwn                 10 00 00 00 c9 71 be fc
node_wwn                 20 00 00 00 c9 71 be fc
alternate-reg            01060020 00000000 00000000 00000000 00000100
reg                      00060000 00000000 00000000 00000000 00000000
                         03060010 00000000 00000000 00000000 00001000
                         03060018 00000000 00000000 00000000 00000100
                         02060030 00000000 00000000 00000000 00020000
compatible               pciex10df,fc40.10df.fc42.3
                         pciex10df,fc40.10df.fc42
                         pciex10df,fc42
                         pciex10df,fc40.3
                         pciex10df,fc40
                         pciexclass,0c0400
                         pciexclass,0c04
clock-frequency          02625a00
#size-cells              00000000
#address-cells           00000002
copyright                Copyright (c) 2000-2007 Emulex
model                    LPe12002-S
name                     SUNW,emlxs
device_type              scsi-fcp
manufacturer             Emulex
fcode-version            3.01a1
fcode-rom-offset         0000c400
interrupts               00000001
class-code               000c0400
subsystem-id             0000fc42
```

```
subsystem-vendor-id      000010df
revision-id              00000003
device-id                0000fc40
vendor-id                000010df
{c} ok



assigned-addresses       82080110 00000000 03504000 00000000 00002000
                         82080118 00000000 03506000 00000000 00002000
                         81080120 00000000 00003100 00000000 00000100
                         82080130 00000000 03580000 00000000 00040000
port_wwn                 10 00 00 00 c9 4b 3b 39
node_wwn                 20 00 00 00 c9 4b 3b 39
alternate-reg            01080120 00000000 00000000 00000000 00000100
reg                      00080100 00000000 00000000 00000000 00000000
                         03080110 00000000 00000000 00000000 00001000
                         03080118 00000000 00000000 00000000 00000100
                         02080130 00000000 00000000 00000000 00020000
compatible               pci10df,fc20
clock-frequency          02625a00
#size-cells              00000000
#address-cells           00000002
copyright                Copyright (c) 2008 Emulex
model                    LPe12002-S
name                     SUNW,emlxs
device_type              scsi-fcp
manufacturer             Emulex
fcode-version            1.50a8
fcode-rom-offset         0000c000
devsel-speed             00000000
class-code               000c0400
interrupts               00000002
latency-timer            00000000
cache-line-size          00000010
max-latency              00000000
min-grant                00000000
subsystem-id             0000fc22
subsystem-vendor-id      000010df
revision-id              00000002
device-id                0000fc20
vendor-id                000010df
{0} ok
```

▼ To Verify Attached Storage (Oracle Solaris)

- **If online storage is connected to the HBA, use the `apply show-children` command to list the attached storage.**

Note - You might need to use the `reset-all` command before using the `apply show-children` command.

In the example that follows, four SANS with 14 to 16 drives each and an FC tape drive are attached to the two ports or a dual-port HBA.

```
{14} ok show-children
Device  PortID 10600  WWPN 200600a0b8220346
   LUN  0     Disk     SUN     CSM100_R_FC     0612
   LUN  1     Disk     SUN     CSM100_R_FC     0612
   LUN  2     Disk     SUN     CSM100_R_FC     0612
   LUN  3     Disk     SUN     CSM100_R_FC     0612
   LUN  4     Disk     SUN     CSM100_R_FC     0612
   LUN  5     Disk     SUN     CSM100_R_FC     0612
   LUN  6     Disk     SUN     CSM100_R_FC     0612
   LUN  7     Disk     SUN     CSM100_R_FC     0612
   LUN  8     Disk     SUN     CSM100_R_FC     0612
   LUN  9     Disk     SUN     CSM100_R_FC     0612
   LUN  a     Disk     SUN     CSM100_R_FC     0612
   LUN  b     Disk     SUN     CSM100_R_FC     0612
   LUN  c     Disk     SUN     CSM100_R_FC     0612
   LUN  d     Disk     SUN     CSM100_R_FC     0612
Device  PortID 10700  WWPN 50020f2300006cee
   LUN  0     Disk     SUN     T300            0301
   LUN  1     Disk     SUN     T300            0301
   LUN  2     Disk     SUN     T300            0301
   LUN  3     Disk     SUN     T300            0301
   LUN  4     Disk     SUN     T300            0301
   LUN  5     Disk     SUN     T300            0301
   LUN  6     Disk     SUN     T300            0301
   LUN  7     Disk     SUN     T300            0301
   LUN  8     Disk     SUN     T300            0301
   LUN  9     Disk     SUN     T300            0301
   LUN  a     Disk     SUN     T300            0301
   LUN  b     Disk     SUN     T300            0301
   LUN  c     Disk     SUN     T300            0301
   LUN  d     Disk     SUN     T300            0301
   LUN  e     Disk     SUN     T300            0301
   LUN  f     Disk     SUN     T300            0301
```

(*continued*)

```
Device  PortID 20600  WWPN 200600a0b8220345
   LUN  0     Disk     SUN     CSM100_R_FC     0612
   LUN  1     Disk     SUN     CSM100_R_FC     0612
   LUN  2     Disk     SUN     CSM100_R_FC     0612
   LUN  3     Disk     SUN     CSM100_R_FC     0612
   LUN  4     Disk     SUN     CSM100_R_FC     0612
   LUN  5     Disk     SUN     CSM100_R_FC     0612
   LUN  6     Disk     SUN     CSM100_R_FC     0612
```

```
   LUN  7     Disk     SUN     CSM100_R_FC     0612
   LUN  8     Disk     SUN     CSM100_R_FC     0612
   LUN  9     Disk     SUN     CSM100_R_FC     0612
   LUN  a     Disk     SUN     CSM100_R_FC     0612
   LUN  b     Disk     SUN     CSM100_R_FC     0612
   LUN  c     Disk     SUN     CSM100_R_FC     0612
   LUN  d     Disk     SUN     CSM100_R_FC     0612
Device  PortID 20700  WWPN 50020f2300003206
   LUN  0     Disk     SUN     T300            0301
   LUN  1     Disk     SUN     T300            0301
   LUN  2     Disk     SUN     T300            0301
   LUN  3     Disk     SUN     T300            0301
   LUN  4     Disk     SUN     T300            0301
   LUN  5     Disk     SUN     T300            0301
   LUN  6     Disk     SUN     T300            0301
   LUN  7     Disk     SUN     T300            0301
   LUN  8     Disk     SUN     T300            0301
   LUN  9     Disk     SUN     T300            0301
   LUN  a     Disk     SUN     T300            0301
   LUN  b     Disk     SUN     T300            0301
   LUN  c     Disk     SUN     T300            0301
   LUN  d     Disk     SUN     T300            0301
   LUN  e     Disk     SUN     T300            0301
   LUN  f     Disk     SUN     T300            0301
Device  PortID 20900  WWPN 500104f00047457b
   LUN  0     Removable Tape     STK     T9840B          1.34
{14} ok
```

Replacing the SFP+ Unit on the HBA

The Small Form Factor Pluggable (SFP+) optics unit on this card is considered a part of the card, NOT as a separate field replaceable unit (FRU). Therefore, in the event that the SFP + unit malfunctions, you must return the entire card in order to receive a replacement SFP + unit. Always return any malfunctioning card with the SFP+ unit attached. For information about removing the card from a system in order to return it, see “To Remove the HBA Hardware” on page 31.

Removing the Hardware

▼ To Remove the Hardware

The following procedures describe how to remove the HBA. Refer to your system installation or service manual for detailed HBA adapter removal instructions.

The hardware removal process involves these general steps:

1. **Halting the operating system and removing power from the server blade, or computer.**
2. **Removing the HBA hardware.**

▼ To Remove the HBA Hardware

1. **Use an ESD strap (refer to “Observing ESD and Handling Precautions” on page 17).**
2. **Refer to your system documentation to shut down, power off, and unplug the system.**
3. **Disconnect all cables.**
4. **Unscrew the case screws and remove the system case.**
5. **Remove the mounting bracket of the HBA from the system by unscrewing the panel screw or removing the clip, whichever is being used.**

   You can now remove the HBA.

♦ ♦ ♦ CHAPTER 3

HBA Software Installation

After you have completed the hardware installation and powered on the system, follow the instructions in this chapter for your operating system to install the HBA driver and any other utilities that are required.

This chapter contains the following topics:

- "Driver Software for the Oracle Solaris OS" on page 33
- "Installing Software For the Red Hat and SUSE Linux OSes" on page 34
- "Installing Software For the Windows Server 2008 or Windows Server 2012 OS" on page 35
- "Configuration and Diagnostic Utilities" on page 36

Driver Software for the Oracle Solaris OS

The HBA driver is included with the Oracle Solaris OS versions supported by the HBA (see "Operating System and Technology Requirements" on page 11). The following additional patches and SRUs are required:

- **Oracle Solaris 10 01/13 (for the SPARC environment)**: patches 149173-04, 144188-02, and 150400-16 (or greater)
- **Oracle Solaris 10 1/13 (for the x86 environment)**: patches 149174-04, 144189-02, and 150401-16 (or greater)
- **Oracle Solaris 11.1**: SRU 16

You can download the latest patches and SRUs from this web site: `http://support.oracle.com`.

Oracle Solaris Diagnostic Support

Diagnostic support for the HBA is included in the Oracle VTS software. The Oracle VTS software is available for download at: `http://support.oracle.com/`

For information about the Oracle VTS software, see the Oracle VTS documentation at: http://docs.oracle.com/cd/E19719-01/index.html

The `emlxtest` utility, which is included in the Oracle VTS software, supports the following functions:

- Connectivity verification
- Firmware version and checksum test
- Self-test
- Loopback tests
  - External
  - Internal, single-bit
  - Internal, 10-bit
  - Mailbox

Installing Software For the Red Hat and SUSE Linux OSes

No updates are required to support the HBA on minimum supported versions of Linux.

For diagnostic support, you might need to rebuild the Linux driver. Before rebuilding the drivers for Linux, you must have the required Linux OS installed on the hard disk. The driver and utilities are available for download at the Emulex support site for Oracle.

▼ To Install the HBA Software For the Linux OS

1. **Go to the Emulex support site for Oracle at:**

   http://www.emulex.com/downloads/oracle.html

2. **Locate the StorageTek section, and click the model number (SG-*model-number*) of the HBA for which you want to install software.**

3. **Locate the Linux Driver section, and click Download to copy the driver files to a local file system.**

4. **Click Download to copy the management utilities to a local file system.**

5. **Click Manual to copy the PDF manual, and then follow the installation and configuration procedures.**

6. **Click PDF Manual to download installation, configuration, and troubleshooting information.**

7. **Install the driver for Linux as described in the Emulex Driver and Utilities for Linux User Manual.**

8. **Install the management utilities as described in the Emulex driver and utilities documentation.**

▼ To Install the HBA Software For the VMware Technology

You must obtain the drivers from VMware.

1. **Go to the Emulex support site for Oracle at:**

   http://www.emulex.com/downloads/oracle.html

2. **Locate the StorageTek section, and click the model number (SG-*model-number*) of the HBA for which you want to install software.**

3. **Click Download to copy the management utilities to a local file system.**

4. **Click Manual to copy the PDF manual, and then follow the installation and configuration procedures.**

5. **Click PDF Manual to download installation, configuration, and troubleshooting information.**

6. **Obtain the driver from VMware and install the driver as described in the VMware documentation.**

7. **Install the management utilities as described in the Emulex driver and utilities documentation.**

Installing Software For the Windows Server 2008 or Windows Server 2012 OS

The HBA driver and applications kits for the Windows Server 2003 or Windows Server 2008 OS is available for download at the Emulex support site for Oracle.

▼ To Install the Software For the Windows Server 2008 or Windows Server 2012 OS

1. **Go to the Emulex support site for Oracle at:**

   `http://www.emulex.com/downloads/oracle.html`

2. **Locate the StorageTek section, and click the model number (SG-*model-number*) of the HBA for which you want to install software.**

3. **Locate the driver section for Windows.**

4. **Download the Driver Kit by clicking Download.**

5. **Click PDF Manual to download the installation guide for the Windows OS.**

6. **Install the driver and management utilities for the Windows OS as described in the installation guide.**

Configuration and Diagnostic Utilities

Use the `HBAnywhere` utility or the `lputil` command-line interface (CLI) utility to configure the HBA. These utilities are available for Linux and Windows OSes and provide support for the following functions:

- Discover local and remote hosts, HBAs, targets, and LUNs
- Reset HBAs
- Set HBA driver parameters
- Update firmware
- Enable or disable the system BIOS
- Run diagnostic tests on HBAs
- Manage out-of-band HBAs
- Manage local and in-band remote HBAs

For more information about the `HBAnyware` and `lputil` utilities, download their user manuals from the Emulex support site for Oracle.

♦ ♦ ♦ CHAPTER 4

Known Issues

This chapter contains any known issues with the HBA. Specific bug identification numbers are provided for Service Personnel. This section contains the following topic:

- "Reboot Fails on the SPARC Enterprise M8000 System " on page 37

Reboot Fails on the SPARC Enterprise M8000 System

Bug 15495849

Issue: On the SPARC Enterprise M8000 system, if you use the `stmsboot` command to provide dual paths to the boot device, on occasion the boot device is not found and the reboot does not succeed.

At the console, the following message will be printed:

```
Can't open boot device
```

Workaround: When this occurs, retry the boot operation. The system will now reboot as expected.